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ABSTRACT

To assist school systems in establishing computer competencies for inservice teacher training and personnel hiring guidelines, the North Carolina State Board of Education in 1985 approved the recommendations of a state task force, and identified three levels of computer competencies for teachers (K-12), i.e., competencies needed by all educators, competencies needed for computer utilization in content areas, and competencies needed for computer specialization. This document explains the generic skills needed for each of these levels and lists, by academic subject, specific computer skills needed to incorporate the computer as an instructional and management tool in: (1) Arts Education; (2) Music; (3) Dance; (4) Theatre Arts; (5) Communication Skills; (6) Healthful Living Education; (7) Physical Education; (8) Mathematics Education; (9) Science Education; (10) Second Language Education; (11) Social Studies Education; (12) Vocational Education; and (13) Exceptional Children Education. Requirements, competencies, and program guidelines for Level III, i.e., certification for Instructional Technology Specialist--Computers, are also outlined. (JB)

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COMPUTER EDUCATION COMPETENCIES

TEACHER EDUCATION PROGRAMS

The advent of the microprocessor and the subsequent influx of microcomputers into the K-12 school setting are such recent phenomena that an overwhelming majority of K-12 educators lack training in computer education. To assist school systems in coping with decisions regarding in-service for existing personnel, as well as competencies needed by prospective personnel, the Department of Public Instruction convened a task force on computer education in the Spring of 1983 to develop a flexible model to be used by school systems and higher education in providing training for teachers and other school personnel in instructional computing. The recommendations of this task force, presented at a public hearing in May 1985, were approved by the State Board of Education later that month. These recommendations -- Computer Education Competencies -- will be effective for all educators in North Carolina on July 1, 1985.

Since educators have varying aptitudes, interests and abilities, the degree to which they can and will be prepared in computer education will vary. Three levels of competency have been identified:

Level I -- Computer Competencies for all Educators
Level II -- Computer Competencies and Utilization in Content Areas
Level III -- Computer Specialization

LEVEL I -- Computer Competencies -- All Educators

This level of competency involves minimum exposure to the uses of microcomputers in a K-12 school setting. The overall goal for this level of competency is to assist the educator in acquiring the knowledge and skills necessary to plan and implement a program of computer awareness (literacy) as defined in the "State Plan for Computer Utilization in the North Carolina Public Schools"; to develop an understanding of computer capabilities and limitations; and to develop skills in the evaluation, selection and use of computer courseware to meet specified instructional objectives.

LEVEL II -- Computer Competencies and Utilization in Content Areas

Training at this level should prepare educators to use computers as both instructional and management tools. Whereas Level I training provides an information base and minimal skill development for all educators, Level II training should enable teachers (grades 6-12) to incorporate the use of computers into their content area instructional planning. Level II competencies should be offered within appropriate subject departments and should provide the necessary knowledge and skills to design unit/lesson plans, evaluate and select appropriate computer courseware, plan effective utilization strategies, and evaluate the results of computer activities.

LEVEL III -- Computer Specialization

The Instructional Technology Specialist--Computers certification is appropriate for educators who, through advanced study and preparation, wish to develop extensive knowledge and skill in the broad area of computer technology and its application to the K-12 curriculum. The role of the computer specialist may vary from one of an educational leader who coordinates the overall computer technology program in a school system or a specific school to one who concentrates in a specific content area or a specific educational process.

LEVEL I - COMPUTER COMPETENCIES FOR ALL EDUCATORS

Competencies Needed By All Educators

1.0 All educators should be able to demonstrate an appropriate understanding of the basic concepts of hardware and software in relation to the use of the computer by:

1.1 Displaying general knowledge of computer technology, particularly as it relates to hardware and software applications.

1.2 Exhibiting familiarity with the basic components of a computer system; e.g., input/output, storage, central processing unit.

1.3 Performing computer operations: on-off sequence, loading/running/saving/copying programs, printing program output.

2.0 All educators should be able to demonstrate knowledge of the capabilities and limitations of computers and programs by:

2.1 Identifying current uses of computers in various areas; e.g., home and recreation, business, industry, transportation.

2.2 Distinguishing between computer capabilities and limitations with special emphasis on its use as an instructional tool.

3.0 All educators should be able to demonstrate the ability to discuss the effects of computers on society by:

3.1 Organizing programs on the current issues which have evolved as a result of the computer; e.g., personal privacy, ethical issues, copyright issues.

3.2 Identifying resources to use to interpret the potential uses of computers and other technologies; e.g., robotics, artificial intelligence, electronic data bases.

4.0 All educators should be able to demonstrate the ability to use the computer in instructional programs by:

4.1 Identifying, evaluating and selecting effective courseware using accepted evaluative criteria.

4.2 Identifying and/or developing teaching strategies necessary to integrate computer courseware into the on-going instructional program.

4.3 Using the computer for Computer Assisted Instruction (CAI); e.g., drill and practice, simulations/games/models, tutorials, problem solving.

4.4 Using the computer for Computer Managed Instruction (CMI); e.g., student enrollment, student performance and grade reporting.

4.5 Identifying effective and various uses of the computer as a tool to support the instructional programs; e.g., word processing, data location and retrieval, test generation.

LEVEL II - COMPUTER COMPETENCIES AND UTILIZATION IN THE CONTENT AREAS

The Level II computer competencies will enable teachers to incorporate the computer as an instructional and management tool in teaching the specific content area(s) of the curriculum. The Level II competencies, which focus on the hardware, software, and peripheral components of computer systems, are minimum competencies to be acquired in preparation programs in each subject area at the middle grades (6-9) and secondary (9-12) areas of certification. The K-12 certification areas (arts education, physical education, etc.) should require that teacher candidates acquire all the competencies in the respective area of certification.

Computer competencies have been identified for all eight preparation programs in Vocational Education. An additional number of competencies have been identified for preparation programs in Business and Office Education.

ARTS EDUCATION - COMPUTER COMPETENCIES

The certification for arts education is K-12. Therefore, all arts educators should have not only the foundation of "Level I competencies, but also, electronic instructional technology competencies that are pertinent to each specific arts education area and are applicable for all educational levels in the public schools.

Visual Art:

1.0 All Visual Art teachers should demonstrate an understanding of basic concepts of computer hardware in relation to art education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer and/or terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Art teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, student performance.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the art room (CMI); i.e., inventory of supplies, equipment, and materials, purchase requests, data and statistical analysis.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the art program (CAI).

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The art teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: graphic tablets, lightpens, mouse, modem, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance creative art teaching and learning experiences.

3.3 Knowing how to select and use appropriate color printers and interfaces and 35mm cameras to produce "hard" copies of computer generated art.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

Music:

1.0 All Music teachers should demonstrate an understanding of basic concepts of computer hardware in relation to music education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer and/or terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Music teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the music room (CMI); i.e., inventory of supplies and instruments, purchase requests, data collecting.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes and for music synthesis in the music program (CAI).

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The music teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: keyboards, guitar synthesizers, electronic musical instrument devices, midi interfaces, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance creative music teaching and learning experiences.

3.3 Knowing how to select and use appropriate printers and interfaces to produce "hard" copies of computer generated musical compositions.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

Dance:

1.0 All Dance teachers should demonstrate an understanding of basic concepts of computer hardware in relation to dance education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Dance teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the dance facility (CMI); i.e., inventory of supplies and instruments, purchase requests, data collecting.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the dance program (CAI).

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The dance teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: keyboards, graphic tablets, electronic synthesizers, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance creative dance experiences.

3.3 Knowing how to select and use appropriate printers to produce "hard" copies of computer generated dance notations to assist in the development of choreography.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

Theatre Arts:

1.0 All Theatre Arts teachers should demonstrate an understanding of basic concepts of computer hardware in relation to theatre arts education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks, e.g., "mainframe", "mini", and "micro" computers.

2.0 Theatre Arts teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the theatre facility (CMI); i.e., inventory of costume, scenery, and lighting supplies, tools and instruments, purchase requests, data collecting, as well as box office, publicity, and record keeping.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the theatre arts program (CAI) in the areas of technical theatre, theatre history, and designing for the theatre.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The theatre arts teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: lighting boards, graphic tablets, electronic stage, lighting and sound design devices, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance creative theatre arts experiences.

3.3 Knowing how to select and use appropriate printers to produce "hard" copies of computer generated theatre staging and choreography.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

COMMUNICATION SKILLS - COMPUTER COMPETENCIES

1.0 All Communication Skills teachers should demonstrate an understanding of basic concepts of computer hardware in relation to Communication Skills education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on/off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Communication Skills teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the classroom (CMI); i.e., inventory of necessary consumable and non-consumable supplies, equipment, and materials, purchase requests, data collecting.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the Communication Skills Program (CAI) relative to the areas of Listening, Speaking, Reading, Writing, Viewing.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The Communication Skills teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: voice synthesizers, graphic tablets, mouse, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance Communication Skills experiences.

3.3 Knowing how to select and use appropriate printers to produce "hard" copies of computer generated information.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

HEALTHFUL LIVING EDUCATION - COMPUTER COMPETENCIES

1.0 All Healthful Living teachers should demonstrate an understanding of basic concepts of computer hardware in relation to Healthful Living education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Healthful Living teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the classroom (CMI); i.e., inventory of necessary consumable and non-consumable supplies, equipment, and materials, purchase requests, data collecting.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the Healthful Living Education program (CAI) relative to the areas of health information, healthful values, and healthful skills.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The Healthful Living teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: voice synthesizers, graphic tablets, mouse, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance Healthful Living experiences.

3.3 Knowing how to select and use appropriate printers to produce "hard" copies of computer generated information.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

PHYSICAL EDUCATION - COMPUTER COMPETENCIES

1.0 All Physical Education teachers should demonstrate an understanding of basic concepts of computer hardware in relation to Physical Education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Physical Education Teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the classroom/facilities (CMI); i.e., inventory of necessary consumable and non/consumable supplies, equipment, and materials, purchase requests, data collecting.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the Physical Education program (CAI) relative to the five major areas of Physical Education instruction: Fitness; Recreational Dance; Stunts, Tumbling, and Gymnastics; Games and Sports; and Basic Movement.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The Physical Education teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: voice synthesizer, graphic tablet, mouse, joystick, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance Physical Education experiences.

3.3 Knowing how to select and use appropriate printers and interfaces to produce "hard" copies of computer generated information.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

MATHEMATICS EDUCATION - COMPUTER COMPETENCIES

1.0 All Mathematics teachers should demonstrate an understanding of basic concepts of computer hardware in relation to Mathematics Education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Mathematics Teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the classroom (CMI); i.e., inventory of necessary consumable and non-consumable supplies, equipment, and materials, purchase requests, data collecting.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the Mathematics Program (CAI) relative to: Attitudes, Process, and Mathematical Concepts and Skills.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The Mathematics teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: voice synthesizer, graphic table, mouse, joystick, modem, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance Mathematics education experiences.

3.3 Knowing how to select and use appropriate printers and interfaces to produce "hard" copies of computer generated information.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

SCIENCE EDUCATION - COMPUTER COMPETENCIES

1.0 All Science teachers should demonstrate an understanding of basic concepts of computer hardware in relation to Science Education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Science Teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the classroom/facilities (CMI); i.e., inventory of necessary consumable and non-consumable supplies, equipment, and materials, purchase requests, science lab data and statistical analysis.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the Science program (CAI) relative to the four major goal clusters described in the Competency-Based Curriculum.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The Science teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: voice synthesizer, graphic table, mouse, joystick, modem, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance Science education experiences.

3.3 Knowing how to select and use appropriate printers and interfaces to produce "hard" copies of computer generated information.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

SECOND LANGUAGE EDUCATION - COMPUTER COMPETENCIES

1.0 All Second Language teachers should demonstrate an understanding of basic concepts of computer hardware in relation to Second Language Education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Second Language Teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, classroom related record keeping.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the classroom (CMI); i.e., inventory of necessary consumable and non-consumable supplies, equipment, and materials, purchase requests, language lab data and analysis.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the Second Language Program (CAI) relative to the five major areas described in the Competency-Based Curriculum: Listening, Speaking, Reading, Writing, and Culture.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The Second Language teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: voice synthesizer, graphic table, mouse, joystick, modem, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance Second Language education experiences.

3.3 Knowing how to select and use appropriate printers and interfaces to produce "hard" copies of computer generated information.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

SOCIAL STUDIES EDUCATION - COMPUTER COMPETENCIES

1.0 All Social Studies teachers should demonstrate an understanding of basic concepts of computer hardware in relation to Social Studies Education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Social Studies Teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, etc.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the classroom (CMI); i.e., inventory of necessary consumable and non-consumable supplies, equipment, and materials, purchase requests, lab data and analysis.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the Social Studies Program (CAI) relative to the seven major areas described in the Competency-Based Curriculum: History, Geography, Economics, Political Science, Anthropology, Psychology, and Sociology.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The Social Studies teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: voice synthesizer, graphic table, mouse, joystick, modem, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance Social Studies education experiences.

3.3 Knowing how to select and use appropriate printers and interfaces to produce "hard" copies of computer generated information.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

VOCATIONAL EDUCATION - COMPUTER COMPETENCIES

1.0 All Vocational Education teachers should demonstrate an understanding of basic concepts of computer hardware in relation to Vocational Education by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Being prepared to set up a computer terminal.

1.3 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.4 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.5 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Vocational Education Teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 Identifying, evaluating, and selecting software programs appropriate for classroom management (CMI); i.e., student enrollment, grades, etc.

2.2 Identifying, evaluating, and selecting software programs appropriate for clerical record keeping in the operation of the classroom/facilities (CMI); i.e., inventory of necessary consumable and non-consumable supplies, equipment, and materials, purchase requests, shop/lab data and analysis.

2.3 Identifying, evaluating, and selecting software programs appropriate for instructional purposes in the Vocational Education Program (CAI) relative to the eight major areas described in the Competency-Based Curriculum: Prevocational, Agricultural, Business and Office, Marketing and Distributive, Health Occupations, Home Economics, Industrial Arts, Trade and Industrial Education.

2.4 Being familiar with Authoring Systems and know how to use these specifically designed software programs for instructional purposes.

3.0 The Vocational Education teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as a creative instructional tool by:

3.1 Exhibiting a familiarity and an understanding for using additional input peripherals and the related software, such as: voice synthesizer, graphic table, mouse, joystick, modem, etc.

3.2 Knowing how Video Tape Recorders and Video Disk Recorders enhance Vocational Education experiences.

3.3 Knowing how to select and use appropriate printers and interfaces to produce "hard" copies of computer generated information.

3.4 Exhibiting an awareness that technology is constantly changing; therefore, the individual professional must actively seek information pertaining to the on-going status of electronic instructional technology.

In addition to the listed Electronic Instructional Technology competencies for Vocational Education, Business and Office Education should also include the following computer competencies:

1.0 Utilize computerized accounting systems and explain how they are integrated into the accounting process.

2.0 Demonstrate proper techniques and skills in the operation of up-to-date keyboarding equipment, including typewriters and micrcomputers.

3.0 Design an information system--including equipment, sources of information, and procedures--to be used in the management decision-making process by:

3.1 Identifying equipment and procedures used in information systems.

3.2 Identifying the impact of computers on management.

4.0 Analyze the role of computerized data processing in our society and its implications for the future by:

4.1 Identifying business applications appropriately processed by a computer.

4.2 Interpreting results of processed data applying reason and logic in evaluating the validity of results obtained.

4.3 Distinguishing purposes and levels of computer hardware and software.

4.4 Identifying features of a management information system.

4.5 Describing various data storage and retrieval systems.

4.6 Designing and preparing data for computer processing.

4.7 Demonstrating proper techniques and skills in using various pieces of computer equipment.

5.0 Analyze results of processed data applying reason and logic in evaluating the methods used and results obtained by:

5.1 Demonstrating the ability to execute package programs common to business.

5.2 Demonstrating the ability to write in at least one business computer language and in BASIC.

EXCEPTIONAL CHILDREN EDUCATION - COMPUTER COMPETENCIES

1.0 All exceptional children teachers should demonstrate an understanding of basic concepts of computer hardware in relation to the education of exceptional children by:

1.1 Exhibiting a working knowledge of computer technology.

1.2 Exhibiting familiarity with the basic components of a computer system; i.e., input/output, storage, retrieval.

1.3 Performing computer operations: on-off sequence, loading/execute/saving/copying programs.

1.4 Understanding the various types of computers and their designed tasks; e.g., "mainframe", "mini", and "micro" computers.

2.0 Exceptional children teachers should demonstrate a knowledge of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI), and Authoring Programs by:

2.1 identifying, evaluating, and selecting software programs appropriate for Computer Managed Instruction (student enrollment, grades, inventories, purchases, etc.) and Computer Assisted Instruction including Individualized Educational Programs (IEP) development.

2.2 Knowing how to use specifically designed software programs and how to modify software programs for instructional purposes.

3.0 The exceptional children teacher should demonstrate an understanding concerning the use of peripheral devices for enhancing the computer as an instructional tool by:

3.1 Exhibiting an ability to use peripherals such as the voice synthesizer, graphic table, mouse, joystick, modem, printer, etc.

3.2 Knowing how to interface computers with video recording equipment.

LEVEL III - COMPUTER SPECIALIZATION

INSTRUCTIONAL TECHNOLOGY SPECIALIST--COMPUTERS

A. Role of Instructional Technology Specialist--Computers

The Instructional Technology Specialist--Computers certification is appropriate for those persons who, through advanced study and preparation, wish to develop extensive knowledge and skill in the area of computer technology (hardware, courseware, programming techniques, sources of information) and its application to the K-12 curriculum. The Instructional Technology Specialist--Computers has the role of decision maker, consultant, and specialist in advising administrators, teachers, and other professional personnel on computer technology. The computer specialist serves as a member of a management team and has responsibilities that include computer skills curriculum planning and implementation; staff development; hardware and courseware evaluation, selection, and integration; production and utilization of resources; and management of personnel and facilities. The computer specialist may be identified by a variety of titles such as computer specialist, computer coordinator, computer resource teacher, instructional specialist for computers, or computer education supervisor.

Preparation programs for the Instructional Technology Specialist--Computers should be sufficiently flexible to allow for differences in the capability, experiences, and educational background of candidates. A candidate for this certification should enter the master's degree program with a North Carolina teaching certification and demonstrate supervisory potential. However, candidates already possessing master's level certification need only obtain those competencies not addressed in a previous program.

B. Competencies Needed by Instructional Technology Specialist--Computers

The role of the Instructional Technology Specialist--Computers may vary from one of an educational leader who coordinates the overall computer technology program in a school system or a specific school to one who concentrates at a certain grade level, a certain subject area, or a certain educational process.

1.0 Knowledge and Understanding

Understanding in depth the area of computer technology (hardware, courseware, programming techniques, informational resources) and its application to the K-12 curriculum. The candidate will be able to:

1.1 Identify hardware and courseware features, purposes, and proper care procedures.
1.2 Demonstrate the ability to set-up and operate computers typical of the types predominant in the K-12 school program.
1.3 Demonstrate the ability to execute package programs common to instructional use in the K-12 curriculum.

1.4 Provide information on the different programming languages suitable for elementary and secondary students.
1.5 Demonstrate the ability to write in at least one educational programming language (e.g., BASIC, Logo, Pascal, COBOL) at a level sufficient to teach a course in that language.
1.6 Identify sources of information on computer technology topics appropriate for the K-12 curriculum.
1.7 Understand the broad area of computer technology as it relates to teaching and learning theory and practice.
1.8 Identify appropriate uses of the computer in the K-12 curriculum.
1.9 Provide information on contemporary issues and trends in computer technology (e.g., ethics, copyright).

2.0 Program Planning and Implementation

Ability to plan, organize, develop, implement, interpret, and evaluate a computer skills program as part of the ongoing instructional program. The candidate will be able to:

2.1 Develop and modify annual and long-range goals for a comprehensive computer skills program as part of the ongoing instructional program.
2.2 Provide leadership for a school system or school computer committee on using computer technology in the K-12 instructional program.
2.3 Implement procedures and direct activities for developing computer skills program guidelines and materials.
2.4 Develop, implement, and monitor programs for computer skills staff development activities.
2.5 Establish and implement procedures for evaluation of the computer skills program; in particular, procedures that use the computer for data collection and evaluation.

3.0 Evaluation, Selection, and Integration

Ability to apply criteria and strategies for evaluation, selection, and integration/use of hardware and courseware into the ongoing instructional program. The candidate will be able to:

3.1 Identify criteria, strategies, and reviewing services/information sources for hardware and courseware evaluation, selection, and integration.
3.2 Develop, implement, and monitor procedures for evaluation, selection, and use of instructional materials for computer skills.
3.3 Develop, implement, and monitor procedures for evaluation, selection, and use of computers in the K-12 curiculum to meet established instructional objectives.

3.4 Provide leadership for a school system or school media advisory or computer committee in evaluating and selecting computer skills materials in accordance with the school system computer plan and existing curriculum.

4.0 Production and Utilization of Resources

Ability to design and implement procedures and activities for using computer skills materials and computer hardware, as well as for developing/producing computer-related materials to facilitate and teaching/learning process. The candidate will be able to:

4.1 Develop, implement, and monitor staff development activities on strategies needed to integrate computer technology into the K-12 curriculum and on the use of computer skills materials.
4.2 Provide leadership to a computer committee in identifying computer skills materials that need to be developed.
4.3 Design and conduct activities on techniques and courseware (e.g., authoring systems, teaching aid generators) that can be used to produce computer skills materials.
4.4 Identify and provide information and training on hardware peripherals and related software appropriate for enhancing computer use.

5.0 Organization and Management

Ability to establish, implement, and manage computer procedures and practices involving program, personnel, resources, and facilities. The candidate will be able to:

5.1 Recognize the school system's or school's organizational pattern, curriculum and instructional objectives, finance regulations, personnel policies, and building facility restrictions affecting the computer skills program.
5.2 Understand and use management skills in dealing with the program, personnel, resources, and facilities applicable to the computer skills program.
5.3 Assist with the acquisition process for computer resources: hardware, courseware, and facility items.
5.4 Provide leadership and assistance for the organization and maintenance of an inventory of school system or school computer resources.

C. Program Guidelines for the Preparation of Instructional Technology Specialist--Computers

The program of preparation should be characterized by flexibility, individualization, and personalization to allow for differences in the capability, experiences, and educational background of candidates. Programs of study for all students will contain common elements; however, the mix of these elements will vary for individual programs of study. It is assumed that candidates admitted to this master's degree program will have obtained teaching certification in a North Carolina approved area and will have exhibited leadership potential necessary for a supervisory position. The program should be sufficiently flexible to allow students who have already obtained a master's level certification, specifically certification in curriculum and/or supervision, to obtain those additional competencies not previously addressed.

Guideline 1: The program should provide a general understanding of the broad area of computer technology as it relates to teaching and learning theory and practice and to the K-12 content areas.

The program should provide a general study of computer technology (hardware, courseware, programming techniques (at lease one educational programming language), sources of information) and its relationship to established learning theory and to instruction in a K-12 curriculum. A study of the contemporary issues (e.g., ethics, copyright) and trends both in the development of the technology and in education should be part of the program of study. The program also should provide experience with the filed of computing in which the computer is used as a tool for and as an object of instruction.

Guideline 2: The program should provide for the development of competencies in planning, organizing, and implementing, interpreting, and evaluating a computer skills instructional program at school system levels.

The prospective computer specialist should develop the ability to plan and implement the educational aspects of a computer skills program with respect to theories, principles, and practices of curriculum development, instructional processes, and learning evaluation. The Instructional Technology Specialist--Computers should have the ability to develop computer skills curriculum and/or activities based on an understanding of the needs and interests of the learner. Study in this area should also include evaluation, selection, and utilization techniques for computer hardware and courseware appropriate for a computer skills program.

Guideline 3: The program should develop knowledge and provide experiences designed to promote the acquisition of several different kinds of leadership styles and understanding of when each style should be used.

Preparation under this guideline should develop a comprehension of principles and practices of instructional leadership--their development, current status and trends. Consideration should be given to the techniques of teacher orientation, in-service education programs, individual and group conferences, and planning/research investigations. The study should include consideration of school organization and administration as it relates to the competence needed by the instructional leader to serve effectively as a member of an educational management team.

Guideline 4: The program should provide an understanding of the purpose, organization, and administration of school systems with special emphasis on the role of the computer specialist in developing and directing activities related to computer technology.

Study in this area should develop understanding of the organization and administration of the school, curriculum patterns, and the computer specialist's role in relating the school program to the community. Emphasis should be placed upon establishment of appropriate computer technology learning environments, record keeping and inventory, school finance, personnel supervision, and management of program and resources.

Guideline 5: The program should develop an individual awareness of the need for continued learning on the job and for intelligent consumption of research and current information.

The program should provide opportunities for the computer specialist to develop the habits and attitudes necessary for continued learning. Emphasis should be placed on maintaining the professional capability needed to interpret the trends and developments resulting from the frequent change in the area of computer technology.